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ABSTRACT

Technology education programs are offered in 10 middle schools, 5 area high schools, 1 alternative high school, and at Central Campus in the Des Moines Independent Community School District. Programs in grades 6-12 consist of hands-on instruction using activities and projects as the medium for teaching modern technologies in the various trades. Program options include 5 core areas of instruction that expand into 17 career fields: graphic arts and drafting, electricity and electronics, metal manufacturing, wood construction, and automotive/power. The technology education budget derives from several resources that support the entire program: district budgets, student fees, levy dollars, and state and federal vocational education reimbursement. The process of implementing the career education and technology education programs involves the following: aiding in infusion of career education throughout the district's various curricular offerings; focusing the teaching of technology education through an appropriate and effective curriculum; developing course instructional improvements; facilitating instruction; providing technical assistance; and assisting in personnel selection. All courses are electives, except in grades 6 and 7. Future plans call for increased use of technology, a new laboratory, continuation of efforts to ensure relevance of curriculum content, acquisition of modern equipment, and increased efforts in measuring student achievement. (Appendices include career avenues model, curriculum flowchart, textbook list, advisory committee, and enrollment figures by school and districtwide.) (YLB)

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DIVISION OF TEACHING AND LEARNING

PROGRAM EVALUATION

CAREER AND TECHNOLOGY EDUCATION
Grades 6-12

Des Moines Independent Community School District
Des Moines, Iowa 50309-3399

U. S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
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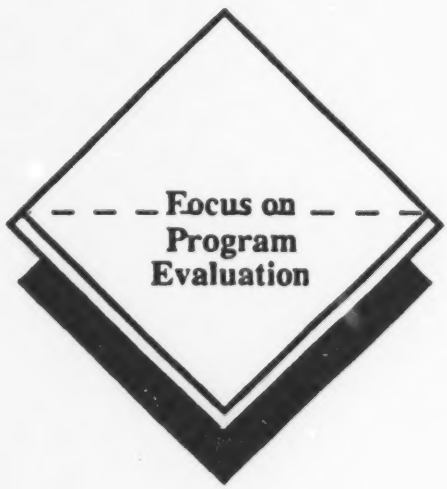

January 1993

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CAREER AND TECHNOLOGY EDUCATION
Grades 6-12

Dr. Raymond Armstrong
Associate Superintendent
for Teaching and Learning

Dr. Barbara Prior
Executive Director
Middle and High School Programs

Mr. Sam Long
Director of Central Campus

Dr. Gary G. McClanahan, Supervisor of
Career and Technology Education

Mr. Larry A. Card, Consultant
Career and Technology Education

Des Moines Independent Community School District
1800 Grand Avenue
Des Moines, Iowa 50309-3399

January 1993

EVALUATION ABSTRACT
CAREER AND TECHNOLOGY EDUCATION
JANUARY 1993

Context Evaluation

Technology Education programs are offered in ten middle schools, five area high schools, one alternative high school, and at Central Campus. Technology Education offers programs in grades 6-12 consisting of hands-on instruction using activities and projects as the medium for teaching modern technologies in the various trades. Program options include five core areas of instruction which expand into seventeen various career fields: graphic arts and drafting, electricity and electronics, metal manufacturing, wood construction, and automotive/power. The Technology Education program exceeds all the requirements of state and federal vocational guidelines for Technology Education.

Input Evaluation

The Technology Education budget involves several resources which support the entire program: district human resources budget, building budgets, student fees, district instructional material budget, district curriculum development/materials budget, levy dollars, and state and federal vocational education reimbursement.

Process Evaluation

The process of implementing the Career Education program and the Technology Education program involves (1) aiding in the infusion of Career Education throughout the district's various curricular offerings, (2) focusing the teaching of Technology Education through an appropriate and effective curriculum, (3) developing course instructional improvements, (4) facilitating instruction, (5) providing technical assistance, and (6) assisting in the selection of personnel.

Product Evaluation

All of Technology Education courses are electives except grades six and seven at the middle school level. Enrollment is therefore a measure of student interest except in those cases where enrollment has to be limited due to space, personnel, or equipment constraints. The 1990-91 school year had a 2.5% increase in enrollment (151 students) over the1989-90 school year, and the 1991-92 school year had a 10.2% increase in enrollment (633 students) over the1990-91 school year.

Future Planning

The continued development and delivery of modern programs is the focus of future plans for the Technology Education Department. Current plans call for an increase in the use of technology, a new laboratory titled, "Technology Laboratory 2005," continuation of efforts to assure the relevancy of the curriculum content, striving for modern equipment, and increased efforts in measuring student achievement.

A copy of the complete report is available upon request from the Department of Information Management, Des Moines Independent Community School District, 1800 Grand Avenue, Des Moines, Iowa 50309-3399. Telephone: 515/242-7839. All evaluation reports are submitted to the Educational Resources Information Center (ERIC) and Education Research Service (ERS).

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DES MOINES INDEPENDENT COMMUNITY SCHOOL DISTRICT
DES MOINES, IOWA

DISTRICT MISSION STATEMENT

"THE DES MOINES INDEPENDENT COMMUNITY SCHOOL DISTRICT WILL PROVIDE A QUALITY EDUCATIONAL PROGRAM TO A DIVERSE COMMUNITY OF STUDENTS WHERE ALL ARE EXPECTED TO LEARN."

TECHNOLOGY EDUCATION MISSION STATEMENT

"TECHNOLOGY EDUCATION WILL PROVIDE DES MOINES' DIVERSE STUDENT POPULATION WITH COMPETENCY BASED LEARNING EXPERIENCES IN THE VARIOUS TRADES, BY ENHANCING ACADEMIC LEARNING THROUGH THE TEACHING OF CONCEPTS FOR HIGH ORDER REASONING, PROBLEM-SOLVING SKILLS, AND WORK ATTITUDES WHICH IN TURN WILL DEVELOP EMPLOYABLE LIFE SKILLS FOR INDEPENDENT CAREER DECISIONS IN A GLOBAL MARKET."

CONTEXT EVALUATION

History

Technology Education/Vocational Education

Iowa has a long history of leadership in the delivery of vocational education programs and services to the mutual benefit of its citizens and its major enterprises.

Technology Education, then called Manual Training, was introduced in the Des Moines schools in the early 1900s. Roy Woolman, the first director for industrial education, developed mechanical drawing and woodworking programs in the high schools. Technology education expanded to the fifth, sixth, seventh, and eighth grades until the establishment of junior high schools. Early technology education programs in the senior high schools were vocational in nature with emphasis on the teaching of skills.

On April 21, 1917, the 37th General Assembly of the Iowa State Legislature accepted the provisions of the Smith-Hughes Act and established a State Board for Vocational Education. The board, which consisted of the State Superintendent of Public Instruction, the State Labor Commissioner, and the President of the State Board of Education, had full authority to carry out the provisions of the national and state vocational education acts and to provide general direction for agricultural, trade and industrial (including commercial and mercantile trades), homemaking education, teacher training, and vocational rehabilitation.

Instruction was delivered through independent school district's high schools in three delivery modes: (1) all-day school; (2) part-time school or extension instruction; and (3) evening schools or supplemental/upgrading instruction.

In the middle 1920s, technology education moved into vocational education by establishing classes in related instruction for apprentices in the building trades at West Junior High School.

In the early 1940s, adult defense education training programs were developed to meet the war needs of industry.

The emphasis in vocational education started in the Des Moines schools shortly after the United States entry into World War II to meet the immediate needs of our country. Federal funds were provided for purchasing equipment and providing instructors to educate in skills that were in demand at that time.

The adult training facilities also became available for part-time use by high school students, thus providing a new dimension to the regular school curriculum. In the early 1940s, the Des Moines district began to plan for a specialized high school that would provide students with salable skills.

Four men who played a key role in the establishment of Tech High School were Roy Woolman, Director of Industrial Education, Newell McCombs, Superintendent of Schools, Cress Hoyt, Assistant Superintendent for Personnel, and W. C. Findley, Assistant Superintendent for Finance and Statistics.

When Des Moines Technical High School (Tech High) opened its doors in 1942, in the old West High School building at 1440 Center, approximately 290 students had enrolled. As the enrollment increased over the next few years, new vocational programs were added to the curriculum to meet the needs of the students and the business and industrial community. Advisory committees of people from business and industry in specific skill areas played a large role in the early

development of the programs and facilities for Tech High. They assisted school personnel in developing and maintaining vocational programs which would provide the students with skills needed by business and industry.

As the school grew, the program became too large for the building and in 1958, Tech High School moved to 1800 Grand Avenue.

In 1982, the Des Moines Independent Community School Board made a decision to close a high school. The closing was necessary due to declining enrollment. The decision reached was to discontinue Tech High School as one of the district's high schools, but continue to utilize it as a vocational center to meet the needs of students, business, and industry.

Today the vocational center is known as Central Campus, which is an extension of all the high schools in Des Moines. Central Campus offers courses in 24 vocational-technical areas, as well as academic classes not available at the home high schools.

Advances in technology and change in our work force demanded that public education prepare students to become informed and productive citizens in the twenty-first century. There is a need, as never before, for academic and vocational educators to work together to develop and support a curriculum with the diversity to meet the constantly changing needs of today's youth. These changes place additional demands on students, making education a necessary lifelong process as we move toward the twenty-first century. Vocational education, integrating with academic programs, provides students with necessary decision-making and higher order thinking skills, thus allowing students to adjust to the ever-changing demands of technology in a global society.

During the 73rd session of the General Assembly of the Iowa Legislature in 1989, Senate File 449 was passed by both the House and Senate. The essence of Senate File 449 says that Iowans must have access to quality vocational programs to meet our citizen's training and retraining needs, as well as to prepare workers for the 21st century.

Career Education

During the 1960s, students were encouraged to enroll in college and obtain a degree. The result was that many entered the labor market educated in careers that were not necessarily in demand. Consequently, a new surge in vocational and technical education developed. In 1971, Dr. Sidney Marland, the U.S. Commissioner of Education, developed the concept of Career Education. It was the goal of career education to blend vocational education, college preparatory education, and general education.

The Des Moines Board of Education and school administrators recognized the impact that career education has on students and during the 1971-72 school year, a master plan was developed for its implementation.

At the elementary level three career goals were identified: career awareness, self awareness, and awareness of others. In junior high the goals were career exploration, value clarification, and goal setting. When the students reached senior high, students could choose to continue to explore specific careers or prepare to earn a living in one specific career area.

In 1972-73, the Des Moines district submitted a proposal to the U.S. Office of Education for Career Education funds. The proposal was approved. The first phase of career education began in 1972-73 at the elementary level.

From 1972-76, career education was implemented in the junior and senior high schools. Career education is still a primary focus of the Des Moines schools. Consequently, career education is infused throughout all curriculum offerings in the district. The development and implementation of a comprehensive career education program provides students with viable options for productive life-styles. The options may involve further education, employment, or both.

The Des Moines schools K-12 infuse career education goals and objectives into the various curricular areas through the district's area supervisors and teaching staff. During the process of textbook adoption, texts are selected that address the subject of careers related to the specific discipline. A primary goal of career education is to increase student and community awareness regarding potential careers outside of the university area through such mediums as:

- Technology Education
- Home Economics: Quest-Skills for Adolescence
- Business Education
- Teacher Advisory Curriculum: Careerways 2000
- New Horizons
- Counseling Services
- R.O.T.C.
- field trips and school-wide assemblies
    a. Career Fairs
    b. Career Fairs--addressing non-traditional jobs for females
- T.Y.E. (Transitioning Youth to Employment)
- Career/Vocational Advisory Committee
- Counseling Office:
    - Middle School: Choices Junior
    - High School: Choices
- Career information through the National Employment Wire Service
- Career Centers located at East High School and Central Campus.

Currently, the Des Moines school district is articulating with postsecondary programs. Students may earn credit in apprenticeship programs and colleges through programs that are currently offered in the Des Moines schools. Presently, this concept and direction is being expanded as opportunities arise.

Teachers have been made aware of the need to relate their course content to future employment. With the passage of S.F. 449 (State Vocational Reorganization Act), the awareness level for career instruction has been enhanced. Courses offered at the sixth and seventh grade levels require all students to explore in various curriculum areas and focus on future career opportunities. This delivery system is essential in order to inform each student of vocational opportunities.

Guidance counselors are at an extreme disadvantage at the middle and high school levels because of the number of students assigned to them. Recently, Des Moines high schools received computer software from the Area Education Association (A.E.A.) which addresses careers. During the 1990-91 school year, a meeting with high school counselors was held which addressed the need for career guidance. Also, at the middle school level a software package (Careerways 2000) was purchased for each middle school and inservice provided.

A flow chart defining the grade levels where career guidance is extremely important was developed (Appendix A). Furthermore, this career guidance flow chart explains suggested actions and assumptions that should be covered with students. District students would prosper if a guidance counselor were assigned at each high school having the specific responsibility of directing students toward careers. Currently, East High School and Central Campus have opened employment centers which address the needs of students regarding career awareness.

Counselors are involved in the following career education initiatives:

- career development; learning to make a living
- students to be made aware of the diverse world of work
- inform the community of the activities in regard to college and careers
- provide materials and supplies to students for career planning
- assist students who are non-college bound
- career exploration on computers
  - Choices Junior (middle school)
  - Choices (high school)

Standards, Policies, and Regulations

Like all vocational education programs, Technology Education is influenced by state and federal legislation.

State legislation influencing the programs for the Des Moines Public Schools includes "Standards for Vocational Education in Iowa," (Senate File 449). Federal legislation influencing the programs is the Carl Perkins Vocational and Applied Technology Education Amendment which was approved in September 1990.

State Legislation and Standards

A. Standards for Vocational Education in Iowa (S.F. 449)

For the first time in Iowa history, educational standards for vocational education are a part of school standards. Standards for vocational education became effective July 1, 1992. The following features are included in this legislation:

1. Seventh and eighth grade programs must include family, consumer, career, and technology education.
2. Instruction shall be competency based, articulated with postsecondary programs and include field, laboratory, or on-the-job training (grades 9-12).
3. The school district must provide a minimum of three sequential units in at least four of the following six vocational areas: agriculture, business, health occupations, consumer and family science, industrial technology, and marketing education.

B. Fiscal Year 1993 State Goals for Improving the Quality of Vocational-Technical Education in Iowa:

1. to increase linkages between secondary and postsecondary programs.
2. to improve academic and occupational competency development.
3. to increase the capacity to assist students with the transition from school-to-work.
4. to increase the relevance and responsiveness of local programs to the labor market, and current and emerging work force needs.
5. to improve the use of performance-based student assessment.

Federal Legislation

Carl D. Perkins Vocational and Applied Technology Education Act of 1990

This act provides federal assistance for vocational education program improvement. Individual

states and school districts will be accountable for improving vocational programs and serving the needs of special populations. In Iowa, plans must address the state goals (state goals may be acquired in the vocational education office).

Instructor Certification

All of the Des Moines Public Schools staff members are licensed with the proper endorsements for Technology Education and Trade and Industrial/Vocational instructors.

The State of Iowa, Department of Education, Bureau of Teacher Education and Certification states:

Chapter 73.21(11) Technology Education, Grades 6-12.
Completion of twenty-four semester hours in industrial technology to include course work in manufacturing, construction, energy and power, graphic communications, and transportation. The course work is to include at least six semester hours in three different areas.

Chapter 82.1(8) Occupational and Postsecondary Certification and Endorsement

Trades and industrial subjects. Demonstrated occupational competence in an industrial, trade, or technical field by performance (6000 hours or three years experience) and written examination (National Occupational Competency Testing Institute -NOCTI). Course work in foundations of vocational and career education, planning and implementing courses and curriculum, methods and techniques of instruction and evaluation of programs and pupils.

Program Descriptions

Technology Education: An industrial science dealing with the principles and practice of teaching and learning specifically in the area of industrial arts.

Technology Education/Advanced Technology (grades 6-12): is that portion of general education which provides opportunities for students in secondary education to develop an understanding about the technical, consumer, occupations, recreational, organizational, managerial, social, historical, and cultural aspects of industry and technology.

Advanced Technology (grades 10-12): is that portion of technology education designed to provide the necessary competencies for job preparation and job entry skills for semi-skilled or skilled craftsmen in processing, construction, production, assembling, servicing, or maintenance. At Central Campus, the program consists of one-half day in the laboratory (core area) and one-half day in related general academic studies in the student's home high school (Appendix B). Course descriptions may be obtained in the office of vocational education in a guide titled, "High School Course of Studies Guide."

Middle and High School Technology Education

With the development of the middle school curriculum in the Des Moines Public School district, the exploratory technology programs identified as "wheel" courses, with a nine week rotation including business, home economics, drama, foreign language, art, and music began. The use of computers is infused into the curriculum meeting the needs of students for current trends in

technology. Students enrolled at the middle school level in Technology Education are involved in programs that involve 70 to 80 percent hands-on activities.

The curriculum incorporates an introduction to advanced technology at the high school level involving experiences in: graphic arts and drafting, electricity and electronics, woodworking, metalworking, and automotive/power.

Special Needs Students

Special needs students have long been participants of the technology programs. Students with identified special needs are assisted in identifying the technology training that best suits their interests and aptitude.

Associates assist special needs students in their technology classes at Harding Middle School, East, North, and Lincoln High Schools. North High School has worked in cooperation with Alternative North behavioral disorder (BD) students in areas related to Technology Education.

Instructional Methods

Advances in technology and changes in our work force demand that we prepare students to become informed and productive citizens. The goal and responsibility of the school is to educate each to his or her fullest potential. Technology education assists with this goal by combining academic skills and knowledge with entry-level occupational, leadership, job getting, job keeping, and entrepreneur competencies, which provide students with the ability to continue their education or to obtain entry-level employment.

Technology Education is an integral part of general education and its purpose is not merely to "make things," but also to provide each student with a wide range of experiences along with pertinent information involving the understanding of concepts, principles, generalization, problems, and strategies of technology. The various instructional methods enhance the awareness and development of each student's potential, abilities, judgment, self-reliance, resourcefulness, and knowledge of self that will be useful in life situations.

The integration of academics and technology programs provides students with necessary decision making, higher order thinking skills and knowledge, thus allowing students to adjust to the ever-changing demands of technology in a global society. Supervisors for math, science, and technology have formed a committee to develop a course titled Science and Math Technology at North High School (implemented during the 1991-1992 school year).

Items Which Have Molded the Current Program

1. Vocational funding (federal and state)
2. Needs assessment and follow-up
3. District budget
4. Two studies
   --Dr. Wolansky's committee report
   --Council of Principals' report
5. Outdated textbooks as a result of not having textbook committees (prior to 1992)
6. State funding in the past included individual grants which are no longer available.
7. Carl Perkins dollars had to be matched by local dollars and could only be used for special needs populations in vocational courses.

8. Senate File 449 and its requirements
   --Sequential units of instruction
   --Competency-based instruction
   --All programs to be articulated with postsecondary programs
9. Carl Perkins division of federal dollars was distributed as follows:
   --22% to secondary schools
   --78% to postsecondary schools
   * Phased in over a three year period of time beginning during the 1992-93 school year:

	Secondary	Postsecondary
--First year	22%	78%
--Second year	50%	50%
--Third year	66%	34%

11. Three year vocational plan for Carl Perkins
12. Interim Supervisory position
13. Vocational evaluation of Central Campus
    --Full-time Supervisor with the addition of a six-tenths consultant
    --Maintain Central Campus and the vocational programs it represents
    --Three Supervisors and one consultant reports to the Director of Central Campus in place of reporting to the Executive Director for Middle School and High School

Goals and Objectives for Technology Education

1. Staff Development
   --Train every instructor on current technologies in their respective areas.
2. Curriculum Revision
   --Articulate with postsecondary institutions in a Tech Prep format (college credit for high school course work)
   --Continue to develop Robotics and other technology courses with a Principles of Technology format
   --Continue to update and integrate modern technologies in the areas of Electricity, Electronics, Radio and Television Production, Horticulture, Animals and Landscaping, Drafting and Graphic Arts
   --National certification
      Automotive certification (NATIFF)
      Graphic Arts (MAVCC)
3. Continue to expand the concepts of integrating math, science, and language arts into vocational courses
4. Develop an articulation catalog
5. Marketing technology programs
   --Development of posters which:
      Display the curriculum flow chart
      Display potential career paths for students
      Display multicultural, nonsexist career opportunities

Market the professionalism in the technology area, marketing individual programs
Market technical preparation articulation

--Develop media marketing
Video tape presentation (Vocational and Technology Education)

--Develop staff professionalism
Business cards
Lab coats

--Improve aesthetics in technology labs

6. Continue to modernize technology labs with high tech equipment (middle school, high school, and Central Campus)
   --Computers in the areas of:
   Drafting (CAD)
   Graphic Arts (Electronic Composition--Desktop Publication)
   All areas for materials inventory and record keeping
   --Equipment to reflect new technologies in all career programs
7. Provide programs for staff recertification

Improvements Which Have Been Made

1. Middle school, high school and Central Campus flow chart--Coordinate all curriculum MS/HS/CC
   --Development of new curriculum guides for each instructional area reflecting new technologies and S.F. 449 requirements (competency-based education in Occupational, Leadership, Job Getting--Job Keeping, and Entrepreneurship)
2. Tool Donations
   -- DMACC
   -- Printing Industries
3. Articulation
   --DMACC
   --Indian Hills
   --Proprietary schools and universities
   --Apprenticeship
4. Miscellaneous
   --Eighth Grade girls CHOICE II
   --Central Iowa Career Fair
   --Greater DM Technology Fair (school club)
   --Middle school conference
   --Marketing
   --Curriculum revision
   --Lab coats, and business cards
   --Painting of lab equipment
   --Housekeeping chores
   --Advisory Committees
   --Infusion of computers into drafting and graphic arts programs
   --Inservice of staff in new technologies
   --Staff improvement in areas of climate, morale
   --Distict-wide air filtration systems

INPUT EVALUATION

Technology Education Budget and Sources for Revenue 1992-93:

- human resources budget
- district instructional materials budget
- student fees for consumables
- curriculum development/materials budget
- building budgets
- state and federal vocational education reimbursement
- community resources

Human Resources Budget

Staff Position	Number of Staff	Total Wage & Ben. (29.5% benefits)	Average Wage Ben.
Middle school teachers	10.5	$433,978.00	$41,332.00
High School	18.0	767,255.00	42,626.00
Central Campus	23.5	1,148,619.00	48,877.00
All Teachers	52.0	$2,349,852.00	$45,189.00
Supervisor of Tech. Ed.	1.0	$63,818.00	
Consultant of Tech. Ed.	0.6	33,452.00	
Secretarial	0.67	14,320.00	
Sub Total		$111,590.00	
Total Wage & Benefits		$2,461,442.00	

District Instructional Materials

Area	Expenditure
Textbook Adoption Budget	$36,200.00

Committees involved:

Commercial Photography
Graphic Arts Central Campus
Graphic Arts Fund/Tech High School
Materials and Processing 8th grade
Energy and Power 7th grade
Engineering Tech & Robotic Systems

Textbooks in use are listed in Appendix C.

Student Fee for Consumables

Senior High Schools

Advanced Technology Education

Subject	Number of Semesters	Fees
Introduction to Advanced Technology Education	1	$10.00
Woodworking Fundamentals	1	10.00
Woodworking Technology	1	10.00
Metalworking Fundamentals	1	10.00
Metalworking Technology	1	10.00
Graphic Arts and Drafting Fundamentals	1	10.00
Graphic Arts and Drafting Technology	1	10.00
Automotive Fundamentals	1	10.00
Automotive Technology	1	10.00
Photography	1	25.00

Central Campus

Advanced Technology Education

Automotive Technology	1	$10.00
Aviation Technology	1	15.00
Commercial Art Technology	1	10.00
Commercial Photography Technology	1	65.00
Drafting Technology	1	10.00
Electricity/Electronics Technology	1	7.00
Electronic Technology	1	5.00
Engineering Technology and Robotic Systems	1	7.00
Graphic Arts Technology	1	10.00
Home Building Technology (Fine Woodworking-Cabinetmaking)	1	5.00
Home Building Technology (Structural Woodworking-Carpentry)	1	10.00
Horticulture, Animals, and Urban Landscaping Technology	1	6.00
Industrial Electricity Technology	1	7.50
Painting and Decorating Technology	1	5.00
Radio/Television Production Technology	1	7.50
Welding/Welding Related Technology	1	5.00

Middle Schools

	Grades		
Technology Education	6	1/2	$5.00
	7	1/2	5.00
	8	1	7.00

Curriculum Development/Materials Budget

Curriculum Development Budget $3,702.02
(committee work for textbook adoption)

Committees:

Commercial Photography
Graphic Arts Central Campus
Graphic Arts Fund/Tech High School
Materials and Processing 8th grade
Energy and Power 7th grade
Engineering Tech & Robotic Systems

Building Budgets (10 accounts)

Technology Education supplies are generally funded at the building level.

Middle School

School	Budget Amount	
Brody	$1,200.00	
Callanan	1,000.00	
Goodrell	500.00	
Harding	1,800.00	
Hiatt	532.00	
Hoyt	400.00	
McCombs	227.00	
Meredith	2,257.00	
Merrill	1,400.00	
Weeks	200.00	Total: $9,516.00

High School

School	Budget Amount	
East	$5,650.00	
Hoover	2,100.00	
Lincoln	3,450.00	
North	1,500.00	
Roosevelt	1,572.00	
Alternative HS South	600.00	Total: $14,872.00

Central Campus	Budget Amount
Drafting Technology	$990.00
Automotive Technology	5,220.00
Auto Body Technology	2,500.00
Aviation Technology	6,250.00

Central Campus (continued)	Budget Amount
Home Building Technology:	
Fine Woodworking	$2,600.00
Structural Woodworking	600.00
Electronic Technology	30.00
Industrial Electricity Technology	500.00
Painting and Decorating Technology	2,621.00
Welding/Welding Related Technology	4,300.00
Horticulture, Animals and Urban Landscaping	2,500.00
Engineering Technology and Robotic Systems	1,500.00
Commercial Art Technology	750.00
Commercial Photography Technology	2,000.00
Radio/Television Production Technology	400.00
Graphic Arts Technology	0.00
	Total: $32,761.00
	Grand Total: $57,149.00

State Reimbursement

Each course in Technology Education has been approved by the State Department of Education. This means that each course has met state standards; consequently, each course receives vocational dollars from the state. State dollars for vocational programs are reimbursed at a rate of 12.5% (1992-93 school year) for instructor's wages who are teaching in a state approved vocational program. Total dollars received by the Des Moines Schools for state approved vocational programs are $426,067. The Department of Technology Education provides the school district with 51% of the total dollars received from the state, an amount of $217,294. This money is administered through the general fund.

The majority of the dollars being spent by the Technology Education Department during the 1992-93 school year is on computers for updating technology in the areas of computer assisted drafting (CAD) and desktop publishing (drafting and graphic arts respectively). The following budget includes dollars from the vocational education funds and the instructional support levy.

Budget For Technology Education

Budget Item	Budget Amount
Travel	$1,150.00
Supplies and Materials	1,000.00
Staff Development/In-service	2,000.00
Equipment replacement	3,000.00
Equipment new	53,217.00
Equipment maintenance	8,009.00
	Total: $68,376

Federal Reimbursement

Carl Perkins Vocational Education Act reimburses schools for serving special needs students in vocational education programs. These funds provide supplemental support services to disadvantaged and handicapped students in vocational education programs. It is anticipated that the Des Moines Public Schools will receive $292,703 of Carl Perkins' dollars for vocational education during the 1992-93 school year.

Carl Perkins' dollars for Technology Education 1992-93:

Budget Item	Budget amount
Salaries (teacher associates)	$25,555.00
Contracted Services	1,573.00
Travel	1,471.00
Mtls/Supplies	18,237.00
Equipment	50,300.00
	Total: $97,136

Community Resources

Technology Education's curriculum and the requirements of Senate File 449 mandate the use of community resources. Each program area at Central Campus must be articulated with a postsecondary institution. Further, each curriculum guide has required competencies for students which involve proficiency in job getting and job seeking skills. Consequently, instructors have involved related businesses in order to increase student awareness of the actual requirements that business demands in order to acquire a job. These businesses are also used for guest lectures, advisory committees, and various field trips.

The following is a partial list of community resources used for Technology Education:

3E Electrical Engineering and Equipment
Big A Auto Parts
Boyer Chemical
Carpenters Apprenticeship
Certified Power Train
Collector Motor Sports
Color Incorporated
Continental Airlines
Crescent Chevrolet
David Penny Photography
Des Moines Community/Adult, and Continuing Education
Des Moines Area Community College
Des Moines Club of Printing House Craftsmen
Des Moines Waterworks
Diamond Vogel
Electricians Apprenticeship
Elliot Beechcraft
Fawn Engineering
Field Paper
Gifford-Brown Electronics

(Continued)

Grand View College
Greater Des Moines Chamber of Commerce
Heartland Area Education Agency 11
I.B.M.
Ideal/Moon Printing
Indian Hills Community College
Iowa Paint
Iowa Power
Iowa Society to Prevent Blindness
Iowa State University
John Deere
John Hetherington Photography
KJWW Engineering Consultants
Kimberly Press
Kragie Newell Advertising Agency
Lincoln Technical Institute
Maynard Printing, Inc.
Meredith Printing
Mid State Distributing
Midwestern Paper
Mitchell Transmission
Multigraphics
Naegele Outdoor Advertising, Inc.
Newman Construction
Noble Ford, Indianola, Iowa
Northwest Airlines
OKLEE Graphics
Page Avjet
Painters Apprenticeship
Paxton Lumber Company
Pittsburgh Des Moines Steel
Printing Industries of the Midland
Puckett Electric Tools
Radio Trade Supply
Ryco, Ames, Iowa
Sasco of Des Moines
Sheetmetal Workers Apprenticeship, Local 45
Sir Speedy Business Printers
South Central Iowa Federation of Labor, AFL-CIO
State of Iowa Department of Education
State Public Broadcasting Network
Steve Peterson Photography
The Prairie Group, Management Consultants
The Principal Financial Group
Toy's Collision Center
United Airlines
University of Northern Iowa
U.S. Army Des Moines Recruiting Battalion
V.O.V Architects
WHO Television
Wesley Advertising
Younkers

PROCESS EVALUATION

Supervisor of Career and Technology Education – 1992-93

Responsibility Statement

It is the responsibility of the Supervisor of Career and Technology Education to provide direction and supervision for career and technology education programs as they relate to the district mission of the Des Moines Public Schools.

Organizational Tasks

The organizational tasks to be performed by the Supervisor of Career and Technology Education encompass planning, implementing, and evaluating in several areas.

The career education curriculum, which is infused in all content area instructional objectives K-12, is monitored by the technology education supervisor. Responsibilities of the Supervisor of Technology Education include content-specific areas of technology education and agribusiness. This includes coordination of curriculum development, textbook selection, program evaluation, and improvement in technology education 6-12, and advanced technology education courses offered at Central Campus (17 programs), and agribusiness. Special needs programs, funded through Carl Perkins legislation, are also coordinated by the technology education supervisor. All state and federal reports, grant proposals, and implementation and evaluation of vocational education are coordinated by the Supervisor of Technology Education. The budgets for technology education, agribusiness, and Carl Perkins Special Needs are the responsibility of the technology education supervisor.

Organizational Relationships

The Supervisor of Career and Technology Education reports to the Director of Central Campus. Coordination of all vocational programs is accomplished cooperatively with the Business Education and Home Economics supervisors. Because a high percentage of the district's vocational programs are located at Central Campus, the Supervisor of Technology Education works closely with the Director of Central Campus and the Council of Principals to maintain coordination of the scope and sequence of vocational program offerings at the home high schools and Central Campus.

It is the responsibility of the Supervisor of Technology Education to be knowledgeable of current national and state trends in vocational education programming and to serve as a liaison for the district in articulating technology education program offerings to postsecondary institutions, K-12 districts seeking shared program agreements, apprenticeship training programs and the employers in business and industry.

1992-93 Objectives

WEIGHT (%)	OBJECTIVE
10%	1. Coordinate Career Vocational Advisory committee(s) in providing input to the district for implementing SF449 and community concerns.
20%	2. Coordinate and facilitate articulation agreements for vocational programs with apprenticeship programs, community colleges, and develop and implement shared program agreements with Area XI school districts.
15%	3. Serve as liaison to the Department of Education for the implementation of SF449 and new federal vocational education legislation (Carl Perkins).
20%	4. Coordinate curriculum updating and textbook selection for the following programs: commercial photography, graphic arts, and engineering technology and robotic systems at Central Campus, graphic arts 9-12 at high school, materials and processing and energy and power grades 6-8 at middle school.
20%	5. Develop and implement a measurement system for student accomplishments in related competencies and academics, grades 9-12.
10%	6. Prepare a technology education program evaluation for a January report.
5%	7. Assist schools with their respective building goals regarding vocational education.

Staff Development, Inservice Opportunities, and Related Equipment in Technology Education

During the 1992-93 school year the Technology Education Department purchased Macintosh LC computers, CAD software, Desktop Publishing software, Hewlett Packard Deskwriter plotter/printer, and related equipment. The premise for purchasing this equipment is to update the technologies presented in drafting and graphic arts courses. In time, more computers will be purchased so that all students have the opportunity to develop their skills relating to desktop publishing (electronic composition) and computer aided drafting. These current technologies are used city-wide and throughout the nation by such companies as Principal Financial and John Deere Corporation.

The Desktop and CAD in-service instruction for technology instructors was developed so staff members receive instruction on skill development, and also gain staff development credit. Also, Phase III credit was available for completion of these courses. Each middle and high school program received a computer after the respective teacher completed the related training.

1992-94 Staff Development Goals for Technology Education

1. To increase staff awareness of effective strategies in dealing with special needs students.
2. To present to and train staff on federal regulations in working with hazardous waste materials.
3. To continue to expand, improve, and complete the objectives outlined for the 1991-92 school year.
4. To develop courses which address new technologies in the related areas of math and science.
5. To encourage middle and high school technology education instructors to expand their individual professional growth plans to include specific activities which increase their knowledge and skills in the following areas:
    a. New technology related to their specific course
    b. Content area update
    c. Marketing of technology education
6. To encourage Central Campus instructors to become involved in building articulation programs with various community colleges and apprenticeship programs.
7. To encourage high schools to implement and evaluate the effect of offering semester courses on an alternating day basis.

1992-93 Staff Development Objectives for Technology Education

1. To increase staff awareness and skills in dealing with special needs students.
2. To present to and train staff on federal regulations in working with hazardous waste materials.
3. To provide training for all staff regarding new technologies in computers relative to their specific course.
4. To present and explain to middle and high school technology education instructors Senate File 449, including articulation between middle school, high school, Central Campus, and post-secondary institutions.

Supporting Activities for 1992-93 Staff Development Objectives

1. Fall In-Service.
2. Guest speakers.
3. In-Service during the work day.
4. Building and departmental meetings.
5. Financial assistance provided to instructors to attend conferences, meetings, and classes related to goals and objectives established.
6. Materials related to goals and objectives provided to instructors.

Professional Meetings, Conferences, Course Work

All staff members are encouraged to become involved with professional organizations related to Technology Education and their specific area of expertise. Technology Educaton instructors may receive money from building budgets, Phase III, and state and federal vocational dollars. Teacher

recertification requires staff members to complete eight renewal units every five years. The consultant of Technology Education coordinates courses which will qualify for renewal units of credit for teachers within the Technology Education Department. Some of the Technology Education professional meetings that are attended by staff members are: The American Vocational Association's annual national conference (AVA), Iowa Vocational Association (IVA), Iowa Industrial Technology Education Association (IITEA), Iowa Council of Local Administrators (ICLA), National Association of Large City Directors of Vocational Education (NALCDVE), and Iowa Association of Middle Level Educators (IAMLE).

Communications within the Technology Education Department

The consultant and Supervisor of Technology Education meet on a regular basis with the technology education staff as the need arises. Communications with instructors is accomplished through personal visits on a regular basis, phone conversations, memos, individual committee meetings, and through a newsletter (Technology Education Communique, TEC).

Advisory Committees

The Department of Technology Education has established advisory committees for each of the program areas represented at Central Campus. The Supervisor of Technology Education, with support from the Supervisors of Home Economics/Health and Business/Marketing, coordinates an advisory committee representing all of the vocational education programs within the school district (Appendix D). The membership composition of these committees includes representatives from business, industry, parents, community organizations, and staff. The premise for advisory committees is to review program needs for the respective areas.

PRODUCT EVALUATION

Student Achievement

Student achievement is the priority goal of Technology Education. Measuring and defining student achievement is one of the most important functions of teaching in Technology Education. During the fall semester of the 1992-93 school year, the staff of Technology Education implemented new curricula for grades 6-12. In grades 9-12 the curriculum is designed around student competencies. Specifically, students enrolled in Technology Education courses at their home high schools begin to develop competencies that flow into the cap-stone courses offered at Central Campus. At the end of each course students are measured by the competencies they have acquired within four areas of instruction:

- Occupational
- Leadership
- Job Getting and Job Keeping
- Entrepreneurship

After completing the total program package (home high school and Central Campus) students are presented with a certificate of completion which identifies the level of proficiency attainment regarding each of the identified competencies. This certificate is a medium of communication for students regarding a portfolio, job, and continued education through articulation agreements including apprenticeships, community colleges, and four-year degrees.

Teachers in the Technology Education Department use a variety of techniques to measure students' progress toward the achievement of the department's mission statement:

> Technology Education will provide Des Moines' diverse student population with competency based learning experiences in the various trades, by enhancing academic learning through the teaching of concepts for high order reasoning, problem-solving skills, and work attitudes which in turn will develop employable life skills for independent career decisions in a global market.

Tests, quizzes, and teacher evaluation of student work are techniques which are further used to evaluate student achievement. Most of the tests given by Technology Education teachers are either constructed by the teacher or are acquired as a supplement to text materials used in the course. Most of the latter are standardized and validated by the publisher of the text materials. Tests are used primarily to measure a student's acquisition of content for a particular course. Quizzes are usually teacher constructed and used frequently to assist students in maintaining their focus and to provide teachers with feedback to evaluate the effectiveness of instructional techniques being employed. The process used for teacher evaluation of student work varies with the type of student work being evaluated. Teachers are encouraged to make the process as objective as possible while infusing appropriate levels of professional judgment. This technique is used most often to measure students' achievement in computation, reading, listening, writing, speaking, thinking and decision making by measuring how well they apply those skills in projects and activities such as class participation, class presentations, written papers, small group work, simulations, and computer projects.

The Technology Education Department prides itself in making course offerings available to all students regardless of their academic ability (special populations). This often results in class rosters where the range of ability among the students is as wide as that of the entire student body. The development of attitudes and skills necessary for interacting with a diverse group of people and functioning in a productive manner is very much a part of Technology Education. The

educational challenges created by this situation are numerous. Teachers must be prepared to meet the various needs of class members by using a variety of teaching strategies and materials. They must also implement an evaluation system that is flexible enough to be equitable to all and that is understood and accepted by all. Most teachers meet this evaluation challenge by striving for an appropriate balance between the use of standards recommended by employers and others and the use of standards within the reach of all or at least most participants.

District policy requires each teacher to summarize the information gained in the evaluation process and report the results in the form of a letter grade. Ideally, that letter grade will be an accurate reflection of the students' achievement, employability, and potential for success in advanced educational endeavors. The supervisor of Technology Education believes competency attainment (outcomes-based measurement) is a more specific, definitive process for evaluating student success and achievement.

Students are also evaluated and presented with awards in Technology Education through a Technology Education Fair. During the 1992 fair numerous awards were presented to schools and students of Des Moines. Specifically, six trophies, eight plaques, 240 gold, silver, and bronze metals, and 1,100 ribbons were given to students to recognize their achievements.

Staff Certification

Technology education staff members are very dedicated to their profession. This department is comprised of 52 staff members who have acquired vocational certification and possibly one or more degrees. Specifically, there are 43 staff members holding bachelors degrees, 23 having masters degrees, two having doctorate degrees, and nine having vocational certification. Many of the Technology Education staff maintain summer employment directly related to their area of instruction enabling them to remain current with the ever-changing technologies.

Adherence To Standards, Policies, and Regulations

Technology Education and its instructors comply with state and federal regulations. The curriculum has been written just recently for each course incorporating global and career education, and higher order thinking. Each course outline includes state identified competencies while blending academics and addressing multicultural nonsexist initiatives. (Information may be obtained in the office of Vocational Education.)

Adherence to State Standards

The Technology Education Program in the Des Moines Public Schools addresses the state requirements for vocational education in the following ways:

1. Middle school programs include Technology Education and Career Education in grades 6, 7, and 8.
2. Curricula at all grade levels are competency based (9-12) and include laboratory training. Further, each course articulates with a community college, apprenticeship, or four-year institution.
3. Programs provide three or more sequential units of instruction.

Supervisor's Observations

1. During the 1991-92 school year, the Technology Education supervisor made 93 visits to the middle and high schools.
2. Excellent teacher-student interaction is frequently observed.
3. Teachers have established a positive learning environment.
4. Students are actively engaged in learning, often in a hands-on laboratory activity.
5. Teachers and students seem to enjoy what they are doing.
6. Teachers effectively use a variety of instructional techniques for serving a diverse student population.
7. Teachers are professional, and as master teachers they are committed to increasing their skills and knowledge.
8. Teachers voluntarily attend numerous in-service and curriculum meetings.
9. Teachers collectively write comprehensive curriculum guides.
10. Teachers share ideas and methods freely.
11. Quality teachers are irreplaceable.

Sudent Enrollment

Student enrollment was at an all time high in Technology Education (Vocational Education) during the seventies and the early eighties. However, during the middle to late eighties enrollment dropped. Many issues are responsible for this enrollment decline ranging from staff reduction, scheduling conflicts, and community perceptions of national educational goals which only reflected the academic arena, or four-year college degrees. Recently, student enrollment in Technology Education has remained steady or increased in the Des Moines Schools (enrollment figures are duplicated counts by semesters, See Appendicies E, F, G, and H). For example, during the 1990-91 school year Roosevelt High School offered only two periods of Technology Education each day. During the 1991-92 school year this number increased to a total of six periods of instruction, and during the 1992-93 school year some students were unable to enroll because of having full sections. The seven period day (implemented during the 1991-92 school year) has allowed some students to take an additional course in Technology Education assisting in an increased enrollment (over the 1990-91 school year). The 1990-91 school year had a 5% increase in enrollment (337 students) over the1989-90 school year, and the 1991-92 school year had a 7% increase in enrollment (545 students) over the1990-91 school year. Student numbers identified by course, teacher, and school may be acquired in the office of Vocational Education.

Senior Survey

Each year the Des Moines Public Schools conduct a survey of the senior class to measure students' attitudes and opinions about the educational programs in which they have participated (this survey may be found in the Vocational Education Office). One portion of the survey asks students to evaluate their experiences in eleven different curricular areas by responding to a series of statements (1=strongly agree, 5=strongly disagree). The responses related to Technology Education are as follows (mean rating for seven high school settings combined):

Statements	**Mean Rating**
Appropriate classes provide information about careers	2.15

(Survey Continued)

Statements	Mean Rating
Classes provide a variety of meaningful learning activities	2.00
Classes use materials that treat students equally regardless of race and sex	1.95
Classes provide for different abilities of students	2.16
Classes provide preparation for further study or training	2.08
Students receive frequent, timely feedback of their progress	2.38
Class sizes are too large	3.23

Equipment and Facilities

During the 1991-92 and 1992-93 school years two Macintosh computers, a printer, and support equipment were added to all graphics and drafting courses. This enabled desktop publishing and computer aided drafting to be taught in all grades 6-12. Central Campus has received additional IBM computers in drafting technology and Macintosh Classic computers in graphic arts technology. Further, Central Campus courses (auto body technology, automotive technology, and fine woodworking) will receive computers to enhance new technologies within each area. Additional computers and computer numerically controlled equipment (CNC) will continue to be a top priority when purchasing new equipment in Technology Education. New technologies are being taught in Technology Education; however, acquiring new technical equipment continues to be a stumbling block because of limited funds. Learning is enhanced when students use computers in the related areas. All staff members teaching in one of the foregoing instructional areas receiving computers have been inserviced regarding the related curriculum.

The supervisor, consultant, and staff members have addressed the issue of improving the aesthetics in each of the laboratories. Older equipment has been painted and cleaned giving a new look to some of our older equipment. Having laboratories looking professional is, and will continue to be, a priority of the Department of Technology Education. Meredith Middle School, McCombs Middle School, and course laboratories at Central Campus (automotive technology and graphic arts technology) have expanded through the addition of a classroom or have gone through a major remodeling. Also, each laboratory district-wide having a high concentration of dust in the air has received a fine air filtration system improving the quality of the air for students and staff to work in. This project, over the 1991-92 and 1992-93 school years, has cost $100,000 in order to complete. Instructors and students are excited about the foregoing improvements.

FUTURE PLANNING

Background Information

Society in the United States is once again realizing Technology Education's (vocational education) importance in education. Our educational system is constantly being compared to Germany and Japan's educational system. In Japan, 30% of the student population is enrolled in vocational education as compared to 6.5% in the United States. Germany has one of the most comprehensive vocational education systems in the world. Students are directed into career paths where businesses provide jobs upon their completion. The United States has very recently identified our educational system as one being primarily geared for the college bound student when nationally only 29% will pursue and acquire a four-year degree. Recently the Department of Labor stated that only 20% of jobs in the future will require a four-year college degree. Our nation's businesses are crying out for a technically trained pool of potential employees who have the skills to support their business. Recently, during a Manufacturer's Committee meeting in Des Moines a Corporate Executive Officer (CEO) stated that the business he represents moved to France because of not being able to find skilled workers in the United States (Iowa). Because of this type of information being discussed nationally, it is hoped that our society will provide respect to people who pursue a vocational career.

In order to gain a renewed respect for Technology Education students, current technology must be incorporated into related fields. This requires modern equipment and staff development training to meet the challenges of the changing technologies. It also requires cooperation from postsecondary educational institutions and business. Students of today must have technical expertise in order to thrive in a communication society. In the educational arena we must blend academics with vocational courses to provide a purpose for the acquisition of knowledge and skill attainment.

Current Objectives Include:

- recognition for students
- a continued pursuit of additional funding
- the pursuit of articulation agreements with postsecondary institutions (Tech Prep 2 + 2 programs)
- a continued staff development program of new technologies in the related fields
- increased marketing
- pervasive computer usage by staff and students
- increased student and parent awareness of the viable careers afforded them through technology education
- gender and ethnic equality in the trades are essential; all students and parents must be informed of the viable careers that can be obtained in Technology Education
- pervasive competency based instruction
- academic instruction infused into vocational courses
- measuring academic and competency attainment (growth)

Instruction

The key to excellence in any classroom will continue to be the master teacher. Quality staff development programs will be essential to update instructors with content information and instructional techniques. Further, hiring the most qualified and experienced teachers is critical to maintaining a quality program.

Future Needs

Technology Education requires pervasive usage of new technologies. Consequently, the pursuit of additional funding to purchase computers and related technologies will always be a number one priority.

Technology Education Laboatory 2005

The future of Technology Education will require a new laboratory setting that may be titled "Technology Laboratory 2005." The program consists of a synergistic curriculum sharpening students' conceptualization skills, critical thinking skills, problem solving skills, and decision making skills, and it challenges students to discover the underlying principles of technology. Further, the program can be designed to integrate math, science, reading, and Technology Education. It is believed that this new lab will truly prepare students for the 21st century while making learning fun and interesting for young people. Because of the initial cost of this program, success is very crucial. To acquire success we must have the following ingredients:

- a supportive administration (building & district)
- a supportive counseling department
- an attractive facility (modern and high tech)
- a teacher(s) who has the expertise and personality to implement and teach the curriculum, one who attracts students, and a person willing to be trained in new technologies and philosophies of instruction
- a committment to provide six full sections of students to begin the program.

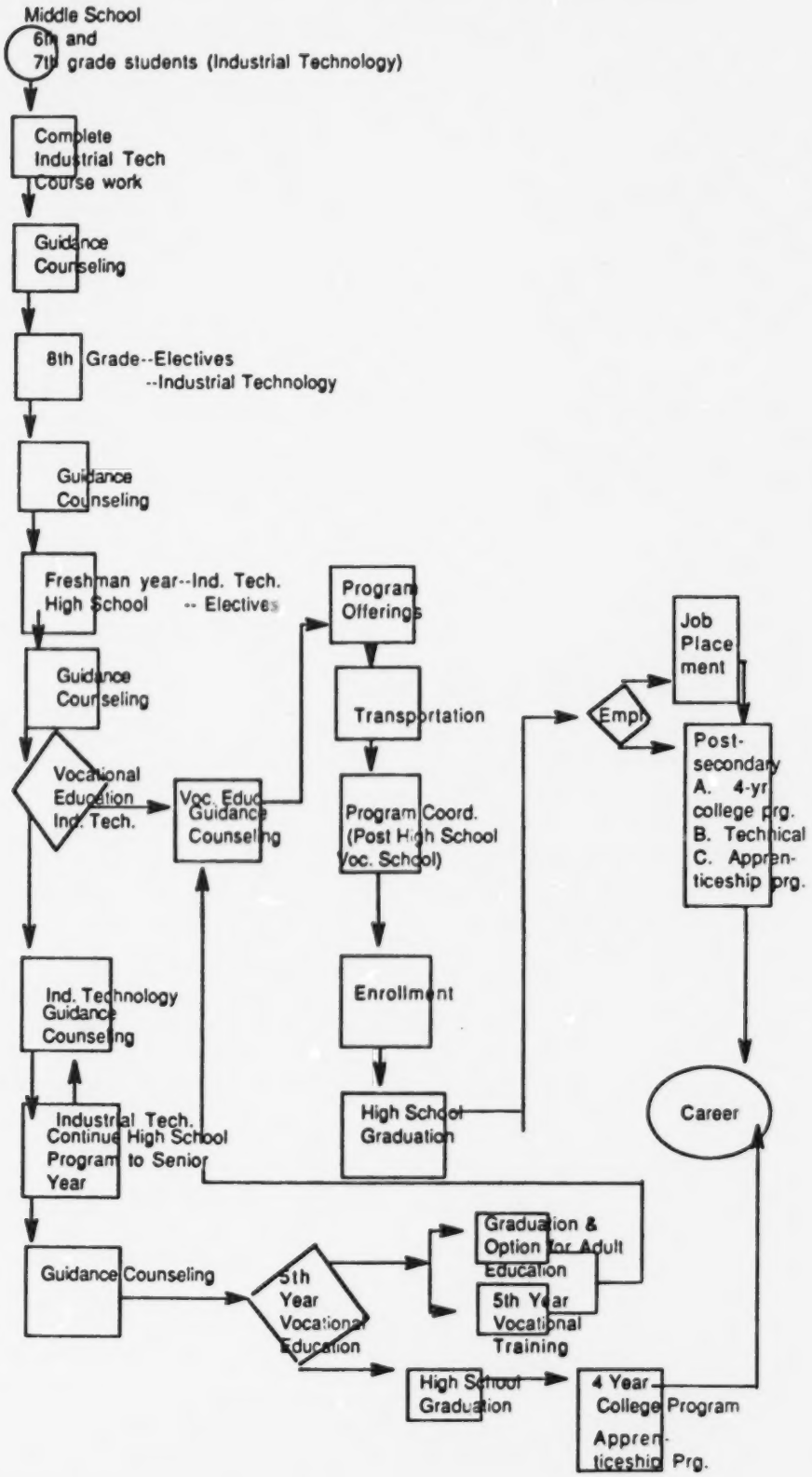
The Technology Laboratory 2005 can be designed to house 30 students during each session. One teacher can manage the instruction; however, many labs are designed to include two teachers or an additional teacher associate. The cost of the equipment is approximately $175,000. The cost to remodel current facilities is approximately $27.50 per square foot.

The Technology Laboratory 2005 would truly provide the Des Moines Schools with a 2005 laboratory which expands beyond the current perception of Technology Education in Des Moines.

Evaluation of Students

To improve the district's ability to track and document the academic achievement and competency attainment of students enrolled in Vocational Education courses, the Technology Education department, in conjunction with the Home Economics and Business Departments, and with the assistance of the Information Management Department, has embarked on a project to develop an efficient, equitable, and effective system for capturing the data needed. The cost of this project will be shared by all three vocational programs and paid for with Carl Perkins funds received by the district. It is hoped that some elements of the system can be developed and piloted during the spring semester of 1993. It is anticipated that this project will require ongoing adjustments as needs and requests for new data occur.

MODEL OF CAREER AVENUES FOR CAREER, TECHNOLOGY EDUCATION STUDENTS DES MOINES PUBLIC SCHOOLS



APPENDIX A

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TABLE 1 COMPONENT ACTIONS AND ASSUMPTIONS

	COMPONENT	ACTIONS	ASSUMPTIONS
1.	Complete Industrial Technology Course Work	All students complete required 6th and 7th grade course work (required courses in industrial technology).	Each individual student is aware that he/she must complete all course work, not just industrial technology.
2.	Guidance Counseling	Counseling for all students regarding 8th grade industrial technology course offerings (refer to flow chart).	Student awareness of career options and increased enrollments will only occur through communication and guidance.
3.	8th Grade	All students complete required 8th grade course work (electives industrial technology).	Each individual student is aware that he/she must complete all course work, not just industrial technology.
4.	Guidance Counseling	Counseling for all students regarding 9th grade industrial technology course offerings (refer to flow chart). Also, discussion on career options (apprenticeship programs).	Student awareness of career options and increased enrollments will only occur through communication and guidance.
5.	Freshman Year High School	All students complete required and elective course work for their freshman year.	Each individual student is aware that he/she must complete all course work, not just industrial technology.
6.	Guidance Counseling	Discuss future career interest, G.P.A., district options, course offerings with an emphasis in the areas of industrial technology and vocational education (apprenticeship programs).	Student awareness of career options and increased enrollments will only occur through communication and guidance.

Table 1 Component Actions and Assumptions

7.	Guidance Counseling	Discuss future career interest, district options, course offerings in the area of vocational education at Central Campus.	Student awareness of career options and increased enrollments, will only occur through communication and guidance.
8.	Program Offerings	Selection of various vocational options.	Each student had the necessary background information to make a cognitive decision.
9.	Transportation	Busing for a.m. or p.m. programs from their home high school or supply your own transportation.	Each student had the necessary background information to make a cognitive decision.
10.	Program Coordination (Post High School Vocational School)	Selected course work regarding career options that receive credit from a trade school (post high school).	Each student had the necessary background information to make a cognitive decision.
11.	Enrollment	Enrollment into a vocational course of study (evaluation of vocational programs).	Each student had the necessary background information to make a cognitive decision.
12.	High School Graduation	High school graduation, unless a student has opted for a fifth year, or graduation has already occurred.	All students have completed district requirements for graduation.
13.	Job Placement	Require employment in your vocational area (apprenticeship programs).	Students no longer require, or select additional schooling (post high school) they elect training in an apprenticeship program.
14.	Vocational Schooling (Post High School)	Enroll into a post high school education program. A. Four-year college program B. Additional technical training C. Apprenticeship program	Vocational programs require additional schooling, or students choose to study in greater detail within their vocational trade. Students may also elect a four-year college program.

Table 1 Component Actions and Assumptions

15.	Guidance Counseling	Discuss future career interests, G.P.A., and building offerings involving industrial technology and possibly vocational education. Discuss Tech Prep opportunities.	Each individual student has elected not to enroll into vocational education and has chosen an avenue for entrance into college.
16.	Continue High School Program to Senior Year	Students complete their sophomore, junior, and a portion of their senior year of high school.	All students are aware of their career choice and the path they are currently traveling.
17.	Guidance Counseling	Senior year discussion regarding: 1. High School graduation (college selection) 2. G.P.A. and college entrance test scores. 3. Vocational options A. Fifth year program B. Adult education 4. Apprenticeship programs.	Students have completed district requirements and are close to graduation.
18.	Graduation and Option for Adult Education	Students elected to graduate with their friends, and study vocational education through adult education.	Students' G.P.A., and college entrance test scores are too low, their interests have changed, which is directing them toward a career path into vocational education.
19.	Fifth Year Vocational Training	Students elected not to graduate from high school and will enroll into a fifth year vocational program.	Students' G.P.A., and college entrance test scores are too low, their interests have changed, which is directing them toward a career path into vocational education.

Table 1 Component Actions and Assumptions

20. High School Graduation	Graduation from high school (college bound)	District requirements are satisfied.
21. Four Year College Program Apprenticeship Program	Enrollment into a four-year college program or apprenticeship program.	G.P.A. and college entrance tests satisfy requirements. Completed Tech Prep requirements.

Classroom of The Future . . .

TECHNOLOGY EDUCATION

CURRICULUM FLOW CHART
for
Career Opportunities

MIDDLE SCHOOL
Technology Education

6th Grade
9 Weeks
(Required Course)

ProductionTechnology
Includes: Woods, Metals, Plastics & Graphics

7th Grade
9 Weeks
(Required Course)

Energy and Power Technology
Includes: Electricity, Power Mechanics & Alternative Energy

8th Grade
18 Week
(Elective Course)

Drafting and Graphic Arts Technology
Includes: Drafting CAD, Graphic Arts, Radio & Television & Photography

Materials & Processes Technology
Includes: Woods, Plastics, Metal, Power & Electricity

HIGH SCHOOL
Introduction to Advanced Technology Education
(one-year course)
9th or 10th Grade
(Course Offering May Vary For Each One Of The Respective High Schools)

10th, 11th, 12th Grade
Course Length:
Semester
Semester

Graphic Arts & Drafting Technology

Combined Course
Graphic Arts & Drafting Fundamentals
Graphic Arts & Drafting Technology

Metal Manufacturing Technology
Metalworking Fundamentals
Metalworking Technology

Wood Construction Technology
Woodworking Fundamentals
Woodworking Technology

Automotive Power Technology
Automotive Fundamentals
Automotive Technology

9th, 10th, 11th, & 12th Grades
***Elec/Electronics Fundamentals Elec/Elec Tech**
(One Year)

CENTRAL CAMPUS
(Advanced Technology Education)
10th, 11th & 12th Grade

*****Graphic Arts Tech***
Commercial Art Technology
*****Commercial Photography Technology***
Radio/Television Production Technology

Drafting Technology
****Engineering Technology & Robotic Systems***

Electronic Technology
Industrial Electricity Technology

Welding/Welding Related Technology

Home BuildingTechnology
A. Fine Woodworking
B. Structural Woodworking
Painting & Decorating Technology
*****Home Remodeling***

Auto Body Technology
Automotive Technology
*****Aviation Technology***

*****Horticulture, Animals, & Urban Landscaping Technology***

*One hour course offered at Central Campus
** Courses offered at locations other than Central Campus: East High School, McCombs Middle School, and Des Moines International Airport
Revised January, 1993

(See Inside Brochure for More Career Planning Information)

COURSE/GRADE	AUTHOR	TITLE	COPYRIGHT	PUBLISHING CO.	USE	COST PER
MIDDLE SCHOOL					PERIOD	BOOK
Production Technology	Feirer/Lindbeck	Production Technology Industry	1986	Bennett & McKnight	1988-94	$13.95
Grade 6		Today and Tomorrow				
Energy & Power Tech	Bohn MacDonald	Energy, Power & Transportation	1986	Bennett & McKnight	1988-93	$14.55
Grade 7	Fales Kuetemeyer	Technology				
Drafting & Graphic	Walker, John R.	Exploring Drafting	5th Edition	Goodheart/Willcox	1988-94	$5.52
Arts Technology	Jones/Robb	Discovering Tech Communication	1st Edition	Harcourt, Brace	1988-93	$16.50
Grade 8				Jovanovich, Inc.		
	Jones/Robb	Activity Guide: Discovering Tech	1st Edition	Harcourt, Brace	1988-93	$6.30
		Communication		Jovanovich, Inc.		
Materials & Processes	Feirer/Lindbeck	Production Technology Industry	1986	Bennett & McKnight	1988-93	$13.95
Technology		Today and Tomorrow				
Grade 8	Bohn MacDonald	Energy, Power & Transportation	1986	Bennett & McKnight	1988-93	$14.55
	Fales Kutemeyer	Technology				
HIGH SCHOOL						
Introduction to High	Hird, Kenneth F.	Understanding Graphic Arts	1982	Southwestern	1989-96	$11.95
School Advanced		(Graphic Arts Technology)				
Technology	Spence, P. Wm.	Drafting Technology & Practice	1980	C.A. Bennett	1985-93	$14.87
Grade 9-10		(Drafting Technology)				
	Boyd, T. Gardner	Metalworking	1982	Goodheart/Willcox	1985-93	$4.35
		(Metals Manufacturing Technology)				
	Speilman, P.	The Basic Book of Woodworking	1979	American Tech Pub	1985-93	$5.82
		(Wood Construction Technology)				
	Walker, John	Exploring Power Technology	1981	Goodheart/Willcox	1985-93	$10.20
		(Automotive Power Technology)				

COURSE/GRADE	AUTHOR	TITLE	COPYRIGHT	PUBLISHING CO.	USE PERIOD	COST PER BOOK
High School Cont.						
Graphic Arts	Hird, Kenneth F.	Understanding Graphic Arts	1982	Southwestern	1985-93	$11.95
Fundamentals & Tech	Broekhulzen	Graphic Communicaiton	1979	Goodheart/Willcox	1985-93	$11.97
Grades 10-12						
Drafting Fundamentals	Brown, Walter	Drafting for Industry	1990	Goodheart/Willcox	1991-98	$24.00
& Technology						
Grades 10-12						
Metalworking Fund	Rupp/McCarthy/Ludwig	Metalworking Technology & Practice	1982	Bennet and McKnight	1986-94	
& Technology						
Grades 10-12						
Woodworking	Hammond/Donnelly	Woodworking Technology	1980	McKnight	1986-94	$25.98
Fund & Technology	Harrod/Rayner					
Grades 10-12	Feirer, John L.	Woodworking for	1979	Glencoe McGraw-Hill	1986-94	
		Industry Tech & Practice				
Automotive Fund	Duffy	Modern Automotive Mechanics	1990	Goodheart/Willcox	1992-99	$24.75
and Technology	Duffy	Instructor's Guides	1990	Goodheart/Willcox		
Grade 10-12						
CENTRAL CAMPUS						
Graphic Arts	Cogoli, John E.	Photo-Offset Fundamentals	1980	McKnight Publishing	1985-93	$12.96
Technology	Walker, John R.	Graphic Arts Fundamentals	1980	Goodheart/Willcox	1982-93	$10.98
Grades 11-12						
Commercial Art	Book	Fundamentals of Copy and Layout	1984	National Textbook	1991-98	$19.95
Technology	Dodd	Graphic Art Production	1990	American Technical Pub	1991-98	$20.22
Grade 11-12						

COURSE/GRADE	AUTHOR	TITLE	COPYRIGHT	PUBLISHING CO.	USE	COST PER
Central Campus Cont.					PERIOD	BOOK
Comm. Photography	Dennis, Ervin A.	Applied Photography	1985	Delmar	1985-93	$17.21
Technology	Walker, Richard J. &	Exploring Photography	1983	Goodheart/Willcox	1985-93	$10.50
Grades 11-12	Walker, Robert E.					
Radio & TV	O'Donnell, Benoit,	Modern Radio Production	1990	Wadsworth, Inc.	1991-98	$22.00
Production Technology	Hausman					
Grades 11-12						
Drafting Technology	Goetsch, David	Technical Drawing	1986	Delmar	1991-98	$34.46
Grades 11-12	Duelm, Brian	Computer Aided Drafting	1989	Goodheart/Willcox	1991-98	$18.00
	Spence	Architecture Design--Engineering--	1991	Glencoe	1991-98	$41.32
		Drawing		MacMillian/McGraw-Hill		
	Spence	Problems and Quizzes	1991			
	Spence	Teacher's Guide	1991			
Engineering Tech		Student resource books				
and Robotic Systems		only, no textbooks				
Grades 11-12						
Electricity/Elec.	Buban, Peter	Understanding Electricity & Elec.	1987	McGraw-Hill	1988-96	$14.37
Technology		Technology				
Grades 10-12						
Electronic Technology	Shrader, Robert L.	Electronic Communication	1985	McGraw-Hill	1988-96	$31.96
Grades 11-12		Electricity Concepts	1986	Energy Concepts, Inc.	1988-96	
	Tinnell, R.W.	Television System Diagnosis	1986	Bobbs-Merrill Educ.	1988-96	$15.95
	Heiserman & Barber	Digital Electronics	1987	E. & Instruments	1988-96	$25.00
		Microprocessors	1st Edition	Heath Company	1988-96	

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Central Campus cont.					PERIOD	BOOK
Industrial Electricity	Miller, Rex	Industrial & Residental Elec.	1988	Glencoe	1988-96	$17.82
Technology	Miller, Rex	Student Activity Workbook	1988	Glencoe	1988-96	$4.95
Grades 11-12	Rockis/Mazur	Electrical Motor Controls	1982	American Technology	1988-96	$20.97
	McPortland, Joe & Brian	National Elec. Code Handbook	1990	McGraw-Hill	1988-96	$43.50
Welding/Welding	Sacks	Welding Principles & Practices (revise	1981	Bennett	1987-95	$22.95
Related Technology	Giachino/Weeks	Welding Skills	1985	American Tech Society	1987-95	$16.47
Grades 11-12						
Homebuilding	Feirer, John L.	Cabinetmaking & Millwork (Fine)	1982	Bennett	1986-94	$22.47
Technology	Wagner, Willis H.	Modern Carpentry (Structural)	1983	Goodheart/Willcox	1986-94	$15.73
Grades 11-12						
Painting and	Painting & Decorating	Painting & Decorating	1975	Vail-Ballou Press, Inc.	1986-94	
Decorating Tech	Contractor's of America	Craftsman's Manual & Textbook				
Grades 11-12	Goodheart/Willcox	Painting & Dec. Encyclopedia	1982	Goodheart/Willcox	1986-94	$18.00
	ORTHRO Books	Painting & Wallpapering	1983	Chevron Chemical Co.	1986-94	$5.59
Home Remodeling	Assoc. of Builders and	Carpentry I	1984	Wheels of Learning	1987-95	
Grades 10-12	Contractors (ABC)	Carpentry II	1983	Wheels of Learning	1987-95	
		Plumbing I	1984	Wheels of Learning	1987-95	
		Electrical I	1984	Wheels of Learning	1987-95	
		Electrical II	1984	Wheels of Learning	1987-95	
		Masonry I	1983	Wheels of Learning	1987-95	
		Heating, Ventilation, Air	1982	Wheels of Learning	1987-95	
		Conditioning (HVAC I)				
		Painting I	1981	Wheels of Learning	1987-95	
	Feirer, Hitch	Carpentry & Bldg Construction		Bennett		
		Basic Home Wiring	1977	Lane Press		
	Havard Massey	Plumbers Handbook	1981	Craftman Book Co.	1987-95	

COURSE/GRADE	AUTHOR	TITLE	COPYRIGHT	PUBLISHING CO.	USE PERIOD	COST PER BOOK
Central Campus cont.						
Auto Body Technology	Scharff, Robert	Motor Auto Body Repair	1992	Delmar	1984-92	$39.95
Grades 11-12						
Automotive	White	Automotive Transmission Textbook	1990	Delmar	1992-99	$23.21
Technology		and Shop Manual				
Grades 11-12	Scharff, Robert	Complete Brake Systems Textbook	1989	Delmar	1992-99	$20.96
		and Shop Manual				
Automotive	Scharff, Robert	Compete Undercar Systems--Steering &	1989	Delmar	1992-99	$20.96
Technology Cont.		Suspension Textbook and Shop Manual				
Grades 11-12	Scharff, Robert	Complete Engine Performance &	1989	Delmar	1992-99	$21.46
		Diagnostics Textbook & Shop Manual				
	Scharff, Robert & Editors	Complete Automotive Engine	1991	Delmar	1992-99	$20.96
	of Automotive Rebuilder	Rebuilding & Parts Machining Txbk				
		& Shop Manual				
Aviation	Government	Aircraft Inspection & Repair	1988	Inter'l Aviation Pub.	1992-99	$14.95
Technology		w/change 3 combined 43-13-2-A				
Grades 10-12	Government	Federal Aviation Regulations Hdbk	1991	Inter'l Aviation Pub.	1992-99	$15.95
	Bent/McKinley	Aircraft Basic Science	1989	Glencoe	1992-99	$32.92
	Bent/McKinley	Maintenance and Repair	1987	MacMillian	1992-99	$33.88
	Bent/McKinley	Power Plants Aircraft	1990	McGraw-Hill	1992-99	$34.52
Horticulture,	Bishop	Working in Plant Science	1978	Glencoe/MacMillian	1985-95	$13.05
Animals, & Urban	Gillespie	Modern Livestock & Poultry Prod.	1983	Delmar	1985-95	$23.96
Landscaping Tech	Kunti	Profitable Soil Management	1984	Prentice Hall	1985-95	$37.95
Grades 10-12	Peterson	Working in Animal Science	1978	Glencoe/MacMillian	1985-95	$13.08
	Richardson	Working in Horticulture	1980	Glencoe/MacMillian	1985-95	$20.22
	Hamilton, Crawford,	Horticulture for Profit & Pleasure	1969	J. M. Dent & Sons	1985-95	$7.00
	Hook, Wilker, Savage					

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Central Campus cont.						
Horticulture,	Blakely & Bade	The Science of Animal Husbandry	1982		1985-95	
Animals & Urban	Reiley, Shry	Introductory Horticulture	1979		1985-95	
Landscaping Tech	Foltz, Henry D.	Fundamentals of Soil Science	1984	John Wiley & Sons, Inc.	1985-95	
Grades 10-12	Bundy, Diggins, Christensen	Livestock & Poultry Production	1975		1985-95	$12.96
Continued	Delorit, Greub, Ahgren	Crop Production	1974-84	Prentice Hall	1985-95	$12.93
	Ingles, Jack	Landscaping	1983		1985-95	
	Evans & Donahue	Exploring Agriculture	1973	Prentice Hall	1985-95	
	Emmons, Robert	Turfgrass Science & Management	1984	Delmar	1985-95	

CAREER/VOCATIONAL ADVISORY COMMITTEE
Des Moines Public Schools
1800 Grand Avenue
Des Moines, Iowa 50309
242-7888

MEMBERSHIP LIST
1992-93

Bob Davitt, Supervisor
Business/Comp. Educ.

Gary McClanahan, Supervisor
Career and Technology Educ.

Julie Rosin, Supervisor
Home Econ./Health

Larry Card, Consultant
Career and Technology Educ.

Ann Wright, Dept. Secretary

****

Aubrey, Mike, Training Consultant
Economic Development Group
DMACC
2006 South Ankeny Blvd.
Ankeny, Iowa 50021
964-6330

Beard, C. J., Senior EEO Associate
Principal Financial Group
711 High
Des Moines, Iowa 50309-1200
247-6360

Bloomquist, Curtis, Dean, Tech. Educ.
Indian Hills Community College
515 Grandview Avenue
Ottumwa, Iowa 52501
(515) 683-5252

Bridgewater, Gary, Vice President
Baker Mechanical
2911 Hubbell
Des Moines, IA 50317
262-9327

Buckley, Gregg, Private Sector
Apprenticeship Coordinator
New Horizons
1800 Grand Avenue
Des Moines, IA 50309
242-7890

Cain, Carl
Director of Consumer Affairs
Midwest Power Systems
P.O. Box 657
Des Moines, Iowa 50303
281-2301

Carr, Cathy, Human Res. Manager
Business Publications
100 - 4th Street
Des Moines, IA 50309
288-3336

Chapman, Mary, Exec. Dean
DMACC Urban Campus
1100 - 7th Street
Des Moines, IA 50314
248-7206

Dorrian, John "Pat", Exec. Dir.
AFL-CIO
Central IA Bldg. & Cons. Trades Co.
3851 Delaware Avenue, Suite 21
Des Moines, IA 50313
262-4911

Fergus, Tom, Consultant
Information Systems
Des Moines Public Schools
1800 Grand Avenue
Des Moines, IA 50309
242-7555

Gray, Ron, TYE Coordinator
Des Moines Public Schools
1800 Grand Avenue
Des Moines, IA 50309
242-7803

Hansell, Mary Jo, Empl. Mgr.
Iowa Methodist Medical Center
Human Resources Department
1313 High
Des Moines, IA 50309
241-8114

Harcourt, Mike
Iowa State Director
Bureau of Apprenticeship Training
210 Walnut, Room 518-B
Des Moines, IA 50309
284-4690

Kuhl, Jan, Supervisor, Guidance/Counseling
Des Moines Public Schools
1800 Grand Avenue
Des Moines, IA 50309
242-7717

Long, Sam, Director
Central Campus
1800 Grand Avenue
Des Moines, IA 50309
242-7846

Mauk, Marty
Private Business Owner
2925 John Patterson Road
Des Moines, IA 50317
266-3501

McClanahan, Rod
Product Support Manager
Ziegler, Inc.
10315 Hickman Road
Des Moines, IA 50322
270-2830

McFarlin, Chuck, Dean
Industrial/Tech Department
DMACC
2006 S. Ankeny Blvd.
Ankeny, IA 50021
964-6364

Monk, Jim, Education Coordinator
U.S. Army
210 Walnut
Federal Building, Room 557
Des Moines, IA 50309
280-7204

Rodari, Surasee "See", Cons. Banker
Bankers Trust Eastgate Office
1538 East Euclid
Des Moines, IA 50313
245-2434

Rogers, Patty, Staff Coordinator
McDonalds Corp.
4825 Merle Hay Road
Des Moines, IA 50322
1-800-533-5717 (EXT 399 Vo.Mail)
276-1526 (O)

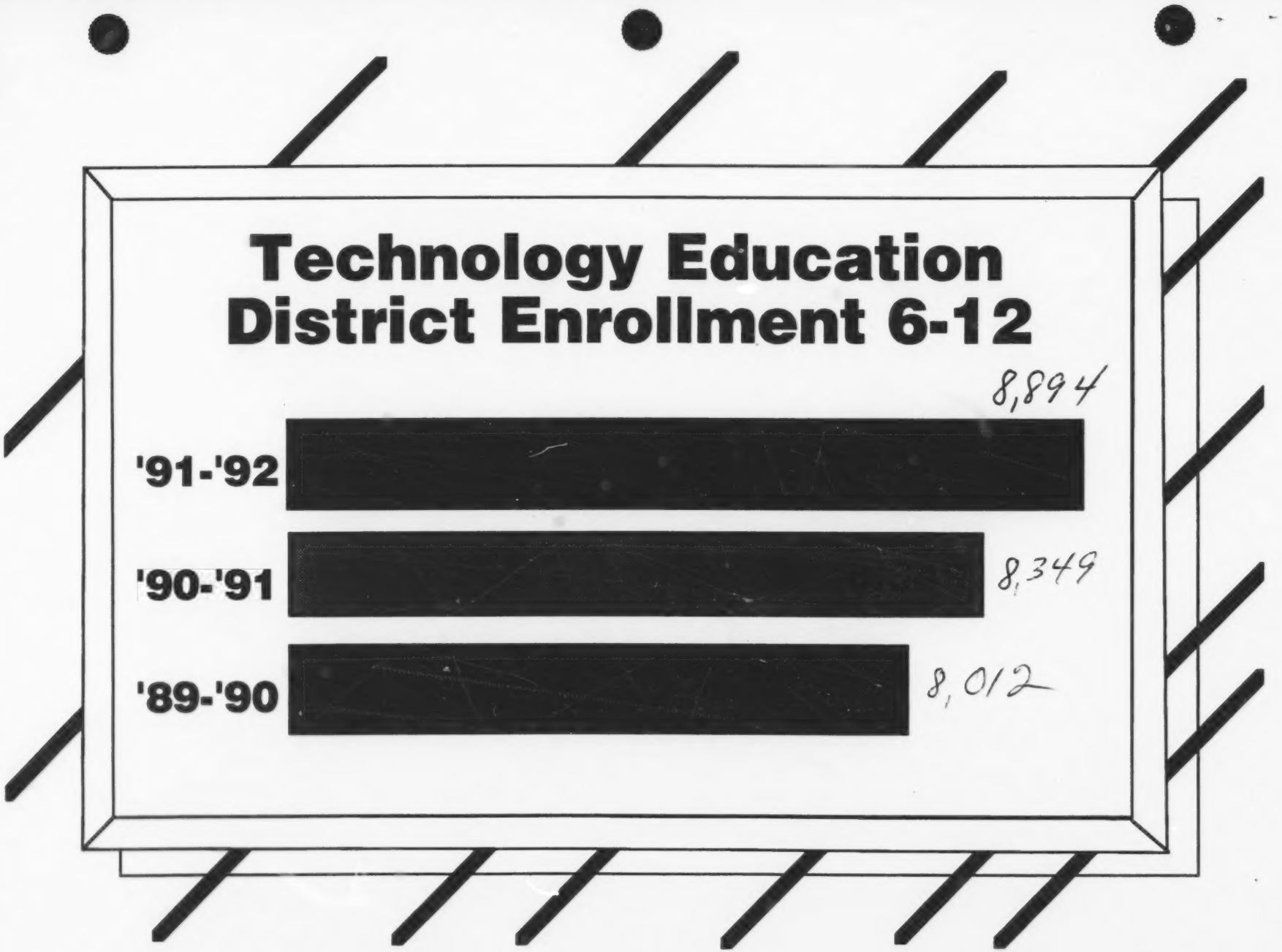
Sandoval, Lorenzo, Director
Program Development & Evaluation
Proteus
P.O. Box 10285
Des Moines, IA 50306
244-5694

Sweeney, Mary, V. Pres. Human Res.
Brenton Banks
Suite 200 Capital Square
Des Moines, IA 50309
237-5123

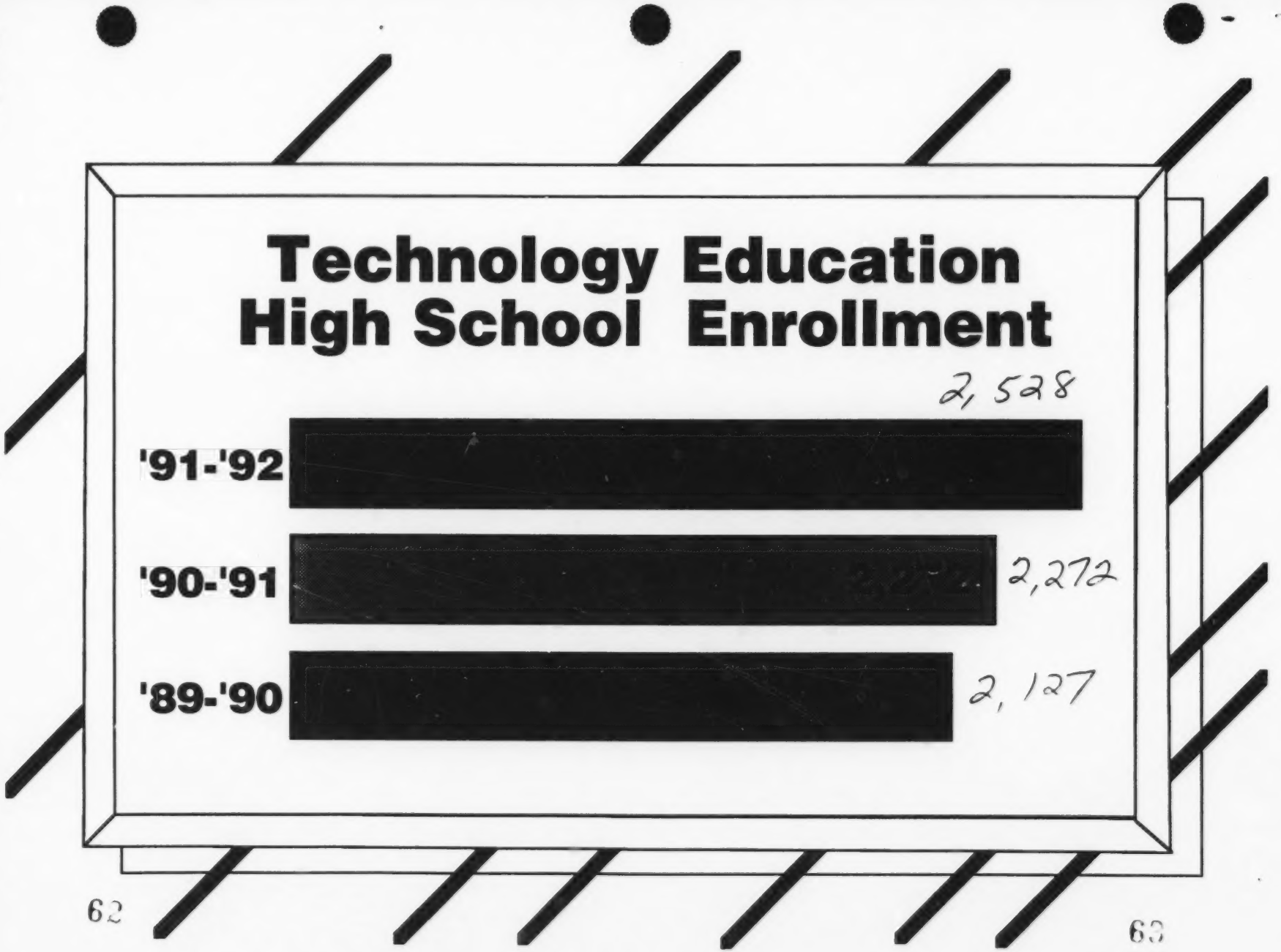
Thompson, Greg, Store Director
HyVee Food Stores
2540 E. Euclid
Des Moines, IA 50317
262-0650

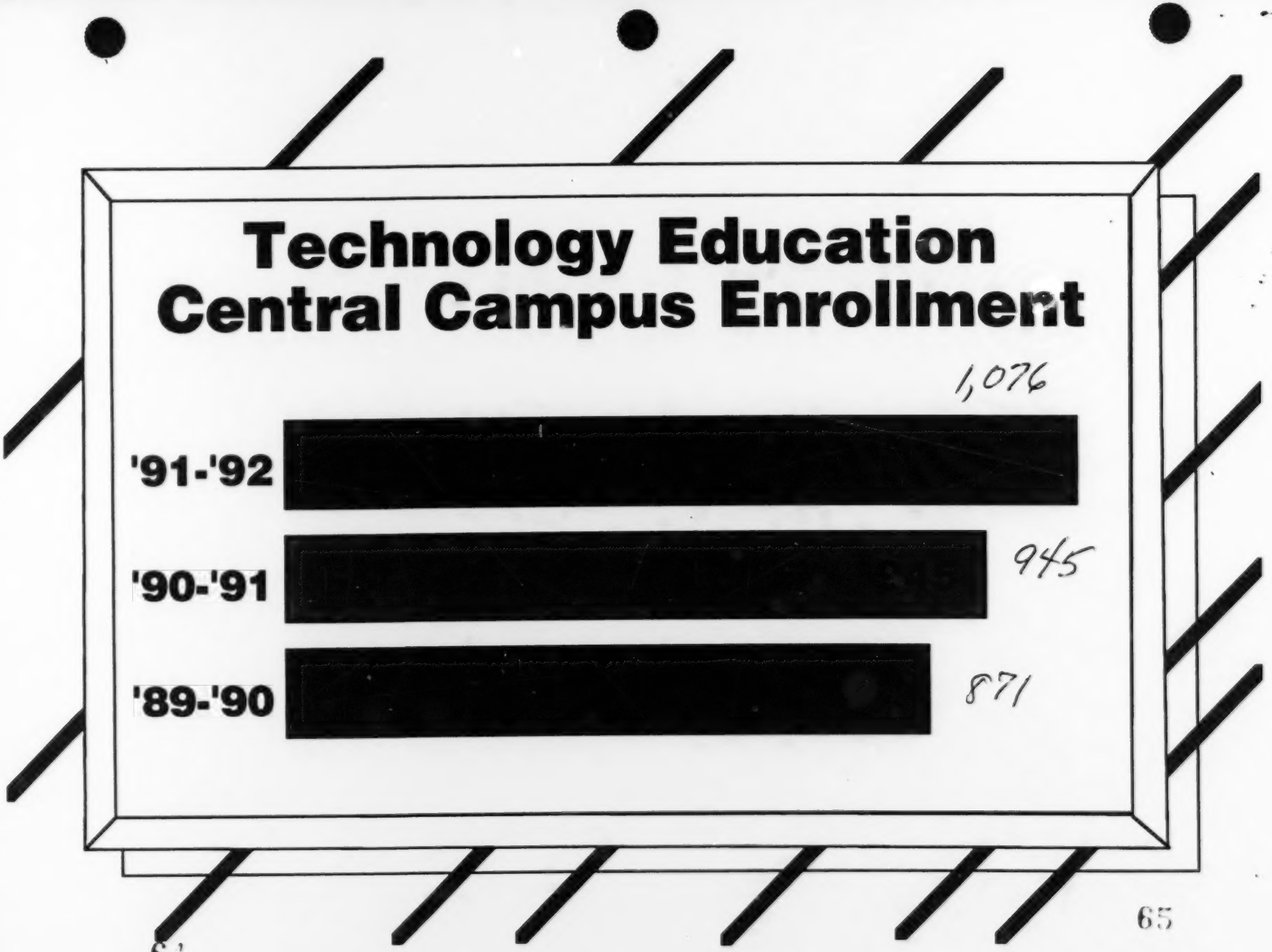
Tyler, Suzzette, Resource Manager
Vocational Rehabilitation
510 - E. 12th
Des Moines, Iowa 50309
281-4145

Zanona, Victor, ASVAB Test Specialist
Department of Defense
2500 University
West Des Moines, IA 50265-1480
224-9715 or 224-0213


Technology Education
District Enrollment 6-12
8,894
'91-'92
'90-'91
8,349
'89-'90
8,012

Technology Education Middle School Enrollment


Technology Education
High School Enrollment
'91-'92
2,528
'90-'91
2,272
'89-'90
2,127


Technology Education
Central Campus Enrollment
1,076
'91-'92
945
'90-'91
871
'89-'90